

What is claimed is:

1 1. A method of determining a configuration of a well, comprising:
2 receiving, at a first module executable in a system, input data relating to
3 characteristics of a reservoir and a well surface arrangement; and
4 selecting, by the first module based on the input data, a trajectory of a
5 wellbore in the well, a type of interface between the reservoir and the wellbore, and
6 completion equipment for installation in the wellbore.

1 2. The method of claim 1, further comprising displaying an output
2 representing the selected wellbore trajectory, type of interface, and completion equipment
3 in a user interface of the system.

1 3. The method of claim 1, further comprising determining, by the first
2 module based on the input data, if the well is to be a multilateral well.

1 4. The method of claim 3, wherein determining if the well is to be a
2 multilateral well comprises determining a type of multilateral well based on one or more
3 of the following factors: the reservoir is mature, flooded, or depleted; a platform has slot
4 constraints; the well has a high-pressure, high-temperature region; the well has a
5 naturally fractured reservoir; the well has a reservoir with heavy oil; the reservoir is a
6 layered reservoir; the reservoir permeability; and the thickness of the reservoir.

1 5. The method of claim 1, wherein receiving input data relating to the
2 characteristics of the reservoir comprises receiving data relating to one or more of the
3 following: a geometry of the reservoir; if the reservoir is fractured; if the reservoir
4 contains heavy oil; a permeability of the reservoir; a vertical permeability to horizontal
5 permeability ratio in the reservoir; a variation of the permeability in the reservoir; and a
6 drive mechanism of the reservoir.

1 6. The method of claim 5, wherein receiving input data relating to the well
2 surface arrangement comprises receiving an indication of whether the well surface
3 arrangement is a land well, an offshore well with a surface platform, or a subsea well.

1 7. The method of claim 6, wherein selecting the well trajectory comprises
2 selecting one of a vertical well, a slant well, and a horizontal well.

1 8. The method of claim 5, wherein selecting the type of interface between the
2 reservoir and wellbore comprises selecting one of an open hole completion, a cased hole
3 completion, and a slotted liner completion.

1 9. The method of claim 8, further comprising receiving input data relating to
2 whether a formation containing the reservoir is a sandstone formation or a carbonate
3 formation,

4 wherein selecting the type of interface is further based on receiving the
5 input data relating to the formation.

1 10. The method of claim 1, wherein selecting the completion equipment
2 comprises selecting an arrangement of a lower completion in the well.

1 11. The method of claim 10, wherein selecting the arrangement of the lower
2 completion comprises selecting a type of sand control arrangement.

1 12. The method of claim 1, wherein selecting the completion equipment
2 comprises selecting a type of artificial lift system.

1 13. The method of claim 1, wherein selecting the completion equipment
2 comprises selecting at least one of a flow control device and a sensor.

1 14. The method of claim 1, further comprising refining a proposed
2 configuration generated by the first module, the proposed configuration comprising the
3 well trajectory, the reservoir-wellbore interface, and the completion equipment.

1 15. The method of claim 14, wherein refining the proposed configuration
2 comprises one or more of the following: determining placement of the well with the
3 proposed well trajectory in the reservoir; determining placement of perforations; and
4 determining a position of completion equipment.

1 16. The method of claim 15, wherein refining the proposed configuration is
2 based on a predefined performance measure.

1 17. The method of claim 16, wherein refining the proposed configuration is
2 based on a constraint selected from the group consisting of a target production rate, a
3 target gas-to-oil ratio, and a target bottom-hole pressure.

1 18. The method of claim 16, wherein refining the proposed configuration
2 comprises invoking a simulator to assess performance of the proposed configuration.

1 19. The method of claim 18, wherein refining the proposed configuration
2 comprises invoking an economics tool to determine effect of the proposed configuration
3 on a predefined economic measure.

1 20. An article comprising at least one storage medium containing instructions
2 for determining a configuration of a well, the instructions when executed causing a
3 system to:

4 receive input data relating to characteristics of a reservoir and a well
5 surface arrangement; and

6 generate a proposed configuration of the well using a rule-based analysis,
7 the proposed configuration including a trajectory of a wellbore in the well, a type of
8 interface between the reservoir and the wellbore, and completion equipment for
9 installation in the wellbore based on the input data.

1 21. The article of claim 20, wherein the instructions when executed cause the
2 system to further determine, based on the input data, if the well is to be a multilateral
3 well.

1 22. The article of claim 20, wherein the instructions when executed cause the
2 system to receive the input data relating to the characteristics of the reservoir by receiving
3 data relating to one or more of the following: a geometry of the reservoir; if the reservoir
4 is fractured; if the reservoir contains heavy oil; a permeability of the reservoir; a vertical
5 permeability to horizontal permeability ratio in the reservoir; a variation of the
6 permeability in the reservoir; and a drive mechanism of the reservoir.

1 23. The article of claim 22, wherein the instructions when executed cause the
2 system to receive input data relating to the well surface arrangement by receiving an
3 indication of whether the well surface arrangement is a land well, an offshore well with a
4 surface platform, or a subsea well.

1 24. The article of claim 20, wherein the instructions when executed cause the
2 system to generate the proposed configuration by selecting an arrangement of a lower
3 completion in the well.

1 25. The article of claim 24, wherein the instructions when executed cause the
2 system to generate the proposed configuration by further selecting a type of sand control
3 arrangement.

1 26. The article of claim 20, wherein the instructions when executed cause the
2 system to generate the proposed configuration by selecting a type of artificial lift system.

1 27. The article of claim 20, wherein the instructions when executed cause the
2 system to generate the proposed configuration by selecting at least one of a flow control
3 device and a sensor.

1 28. The article of claim 20, wherein the instructions when executed cause the
2 system to further refine the proposed configuration.

1 29. The article of claim 28, wherein the instructions when executed cause the
2 system to refine the proposed configuration by performing one or more of the following:
3 identify a placement of the well with the proposed well trajectory in the reservoir;
4 identify a placement of perforations; and identify a position of completion equipment.

1 30. The article of claim 29, wherein the instructions when executed cause the
2 system to refine the proposed configuration based on a predefined performance measure.

1 31. The article of claim 30, wherein the instructions when executed cause the
2 system to further invoke a simulator to assess performance of the proposed configuration
3 in refining the proposed configuration.

1 32. A system comprising:
2 a processor; and
3 one or more modules executable on the processor to receive input data
4 relating to characteristics of a reservoir and a well surface arrangement,
5 the one or more modules executable to further generate a proposed
6 configuration of the well, the proposed configuration including a trajectory of a wellbore
7 in the well, a type of interface between the reservoir and the wellbore, and completion
8 equipment for installation in the wellbore based on the input data.

1 33. The system of claim 32, further comprising an optimizer module
2 executable on the processor to refine the proposed configuration based on a performance
3 measure.

1 34. The system of claim 33, further comprising a simulator executable on the
2 processor, the optimizer module to invoke the simulator to determine effect of the
3 proposed configuration on the performance measure.

1 35. The system of claim 32, further comprising a storage containing case
2 histories of installed completions in respective wells, the one or more modules to access
3 the case histories in generating the proposed configuration.